

good as the few skulls which were found. But I must say that one fossil monkey-skull or man-ape skull which really belonged to a human proprietor has never been found. Every addition which we have obtained in the material inventory of objects for discussion has moved us further away from the problem to be solved. Now of course we cannot avoid the consideration that perhaps it was on some quite special spot of the earth that tertiary man lived. This is quite possible, since during the last few years the remarkable discovery has been made in North America that the fossil ancestors of our horses occur in countries from which the horse had entirely disappeared for a long time. When America was discovered there were no horses there at all; in the very place where the ancestors of our horses had lived no living horse had remained. Thus it may also be that tertiary man has existed in Greenland or Lemuria, and will again be brought to light from under the ground somewhere or other. But as a fact we must positively acknowledge that there is always a sharp limit between man and the ape. *We cannot teach, we cannot designate it as a revelation of science, that man descends from the ape or from any other animal.* We can but designate this as a problem, may it seem ever so probable and may it lie ever so near.

We ought to be sufficiently warned by the experiences of the past, at a time when we are not justified in drawing conclusions, not unnecessarily to burden ourselves with the obligation, or yield to the temptation of drawing them all the same. Look you, gentlemen, it is in this that the difficulty lies for every naturalist who speaks to the world at large. Whoever speaks or writes for the public, ought, in my opinion, doubly to examine just now, how much of that which he knows and says is objective truth. He ought to try as much as possible to have all inductive extensions which he makes, all progressing conclusions by the laws of analogy, however probable they may seem, printed in small type underneath the general text, and to put into the latter only that which really is objective truth. In that case we might perhaps succeed in gaining an always increasing circle of followers, in obtaining an always increasing number of fellow-workers, and in causing the educated public to continue to take part in that fertile manner in which it has already taken part in many domains. Otherwise, gentlemen, I fear that we overrate our power. Certainly old Bacon said with perfect justice, *scientia est potentia*, knowledge is power. But he has also defined knowledge, and the knowledge which he meant was not speculative knowledge, not the knowledge of problems, but it was the objective knowledge of facts. I think that we should abuse our power, we should endanger our power, if in our teaching we do not fall back upon this perfectly justified, perfectly safe, and impregnable domain. From this domain we may as investigators make our excursions in the direction of problems, and I am convinced that every attempt of this kind will then find the necessary safety and support.

AMERICAN SCIENCE

THE principal paper in the *American Journal of Science and Arts* for November, is Prof. Marsh's able address at the recent meeting of the American Association, on the Introduction and Succession of Vertebrate Life in America, which we have given at length. —Discussing the question, Is the existence of growth rings in the early exogenous plants proof of alternating seasons? Dr. Warring concludes from observations, that some exogens form rings at intervals much less than a year; others require intervals of several years, and some form no rings. The presence or absence of rings in exogens occurs in all climates. Large and well-defined rings are found where there is absolutely no appreciable variation of temperature or moisture throughout the year. An exogen naturally forming rings will continue to form them, although the climate become uniform throughout the year. Thus the existence of these markings in ancient flora gives no information as to the existence at that time of seasons, and so far as they are concerned we are left free to adopt any conclusion as to inclination of the earth's axis, which may appear most reasonable. —Some years ago Prof. Newcomb showed that the improvements introduced into the theory of the moon's mean motion by Hansen's lunar tables did not extend to the inequalities of long period in that motion. While Hansen, by an empirical term had secured a very good agreement with observations from 1750 to 1860, this agreement was found to have been obtained by sacrificing the agreement before 1750, and the moon had then begun to deviate from the tables at such a rate that they could

not continue satisfactorily to represent the observations. Prof. Newcomb has since attempted a complete discussion of all recorded observations of any astronomical value before the year 1750, and his suspicion has been entirely confirmed. The results of this examination are communicated. Comparing a theory of the moon's mean motion founded on gravity alone, with the observations, he is led to suppose that the deviations may be due to the action of some of the bodies of the solar system. He corrects Hansen's term by an empirical addition. — Prof. Dana contributes to the number a note on the Helderberg formation of Bernardston, Massachusetts, and Vernon, Vermont, and Mr. Mallet describes "Serpylite," a new niobate, from Amherst County, Virginia.

The *New York Tribune* states that the Johns Hopkins Scientific Association has recently been organised in Baltimore. Prof. Sylvester is president, Prof. Remsen, vice-president, Dr. Story, secretary. A great feature in the programme is that the essays presented are to be short and concise, and to contain the particulars of original research exclusively. There is also to be a discussion of new scientific publications, both foreign and domestic, at the meetings, of which the first has been held, with a score of members present.

Under date November 20, the *Tribune* has the following telegram from Washington:—Messrs. S. H. Scudder of Cambridge, and F. C. Bowditch, of Boston, have just returned from a two months' tour in Colorado, Wyoming, and Utah, where, under the direction of Dr. Hayden, they have been exploring for fossil insects and collecting specimens especially in the high regions. They report having secured many specimens of fossil insects at different points along the railways from Pueblo to Cheyenne, and from Cheyenne to Salt Lake, as well as at Lakin, Kansas, and Garland, and Georgetown, Col., and in various parts of the South Park and surrounding region. Their time was so limited that they were unable to visit White River and explore the beds of fossil insects known to exist there. Ten days were spent at Green River, and in that vicinity, in exploring the tertiary strata for fossil insects, but with very unsatisfactory results. Near Florissant the tertiary basin was found to be exceedingly rich in insects and plants. Mr. Scudder spent several days in the careful survey of this basin, and estimates that the extent of the insect-bearing shales there is at least fifty times as great as that of those in Southern Bavaria. Six or seven thousand specimens of insects, and 2,000 or 3,000 of plants have already been received from Florissant, and as many more are expected before the close of the year. Arrangements were also made with persons who have found a new and rich deposit of fossils in the tertiary strata in Wyoming to forward all the specimens obtained there. Mr. Scudder believes that the tertiary strata of the Rocky Mountain region are richer in the remains of fossil insects than any others in the world, and that within the next few months the amount of material at hand for the study of the subject will be greater than was ever before possessed by any single naturalist. Prof. Joseph Leidy, the comparative anatomist and microscopist, has also recently returned from his second visit to the west, under the direction of Dr. Hayden. His field of operations during the past season was the country about Fort Bridger, Uintah Mountains and the Salt Lake Basin. The specimens he has collected comprise the lowest and simplest forms of animal life, the most minute requiring high microscopic power to distinguish their structure.

THE METEOR

WE have received some further communications concerning this remarkable phenomenon, and some interesting details concerning a similar body will be found in our "Astronomical Column." Mr. A. O. Walker writes from Chester:—

In reading the notice of the meteor of November 23 in *NATURE*, vol. xvii. p. 94, I am surprised to see no mention of any report from it. As I only heard it without seeing it I send you the notice of it from my diary, written immediately after the occurrence:—

"About 8.30 P.M. heard a loud report like that of a cannon (say 32 lbs.), fired about 200 yards off, which shook the house, and the servants saw a bright flash. The sky overhead was quite clear and only cloudy on the horizon south and east. Thought it was the explosion of an aerolite."

Next day I made inquiries and added the following:—

"Parry and Field said the flash was blue, and five minutes

elapsed between the flash and bang. Parry's girl was outside, and came in crying; said she had seen 'a very funny kind of lightning.' Parry remarked it shook his door."

The two men named above are in my employ, and live about 300 yards from my house. Some friends of ours living about two miles from us also saw the flash and heard the report, but the latter not so loud as we did. They described it as sounding as if a bird had flown against the window."

I give the above extracts *verbatim*, as first impressions, uninfluenced by what one hears or reads subsequently, are much the most valuable.

Dr. S. Drew, of Chapelton, Sheffield, writes as follows:—
I send you the following calculations as to the meteor of November 23. They may interest some of your readers. The estimates are only intended as approximate, as the observations at different points of view were too vague for much accuracy, and indeed, in two instances, obviously quite unreliable.

The visible course of the meteor appears to have been from a point about 150 miles above the town of Workop to the Irish Channel, north-west of Liverpool, probably nearly half-way between Liverpool and the Isle of Man—a direction from east by south to west by north, the horizontal distance traversed being rather over 100 miles and the perpendicular 150 miles. The size of the fire-ball before breaking up was about 150 yards in diameter. By this is meant the size of the luminous sphere, not that of the actual bolide, which would be much less.

The rate of motion was near twenty miles per second in horizontal, and thirty miles in perpendicular; as this in horizontal is little more than would be caused in appearance by the orbital and diurnal motion of the earth, it is evident that the proper motion of the meteor was nearly perpendicular to the earth's surface; and, if belonging to the solar system, it must have moved in a very eccentric orbit, stretching far beyond that of the earth. The meteor broke at an elevation of about fifty miles, and then appeared much larger. The fragments must have dropped into the sea.

Was it seen from Ireland or the Isle of Man?

S. A. K. writing to the *Manchester Courier* from Blackpool states that about 8.30 P.M. on the 23rd he beheld a ball of a pale blue colour shoot across the sky from east to west, followed by a train of rainbow lines, brilliant beyond description. "It was over in a moment; but as I and several others stood discussing the phenomenon we had just witnessed, two muffled booms as of far-distant cannon were distinctly heard in the west, after an interval of two or three minutes." Capt. Tupman writes from the Royal Observatory, Greenwich, to the *Times*: "There is reason to suppose that the great meteor which appeared at 8.20 P.M. on Friday last (November 23) fell into the sea near the mouth of the river Dee. From its splendour it was probably seen by many persons near the shores of North Wales, Cheshire, and Lancashire, whose observations would be of the greatest value; and I venture to solicit the publicity of your columns in order that such observations may be forwarded here. On Tuesday night (Nov. 27), at 10.26, G.M.T., I observed another pass slowly from a point about 6° over Castor to 5° left of Sirius. It remained in sight fifteen or sixteen seconds, determined by counting. Towards the end it became faint, of a dull red colour, and moved with extreme slowness. I have no doubt it must have appeared very large to observers near Dover and in Normandy, and it is to be hoped its path has been recorded elsewhere."

A meteor was observed at Strassburg on November 23, the very day when the meteor was observed in England, but the time was a little after six o'clock (local time), and the direction from north to south. A violent detonation was heard, but without any resemblance to that of thunder. The light was as vivid as ordinary lightning at Strassburg. A witness states that he saw the meteor falling at a small distance from him (three or four metres) in a wood belonging to the Chevaudier de Valdrome on the new road leading from Lorquin to the French frontier. All the trees were illuminated as if by daylight. It is not reported by the *Strassburg Gazette* whether any stone was found on the spot.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE

OXFORD.—The Brackenbury Scholarship in physical science has been awarded to Mr. Cunningham, Balliol College.

LONDON.—The Council of University College have awarded the Sharpey Physiological Scholarship to Mr. Patrick Geddes and the Joseph Hume Scholarship in Political Economy of 20*l.* per annum for three years to Mr. J. G. Schurman.

EDINBURGH.—A public meeting, under the presidency of the Right Hon. the Lord Provost, was held on the 29th ult. at Edinburgh to advocate the claims of the Edinburgh University Buildings Extension Scheme. The cost of the new medical school, &c., will be about 187,000*l.*, and of that sum 82,000*l.* has been subscribed by the public and 80,000*l.* has been promised by Government on condition that the remaining 25,500*l.* be subscribed before the end of next year. It was announced that about 10,000*l.* of this has been promised, leaving upwards of 14,000*l.* still to be raised. In support of the appeal it was mentioned that in some class-rooms there is not sitting room for the students. The number of students is increasing every year, there being at present enrolled 212 more than at the same time last year, so that before the summer session is over there will probably be close on 2,500 students matriculated.

The first meeting of the fourth session of the Chemical Society of the University was held in the University on November 28, the president, Prof. A. Crum Brown, in the chair. The president gave an introductory lecture on the "Life and Works of Dr. Joseph Black." The following office-bearers were elected for the ensuing session:—President—Prof. A. Crum Brown; Vice-Presidents—J. Gibson, Ph.D., F.R.S.E., W. Inglis Clark, B.Sc.; Secretary—J. Adams; Treasurer—C. Maxwell, R.N. The society numbers fifty-two members, and ten new members were proposed.

MANCHESTER.—A Chemical Society has been commenced at the Owens College. The society is intended to include all students of science at the College—Dalton Scholars, Associates, and a few others connected now, or in the past, with the Science Classes of Owens College. The society was opened on Wednesday evening by an address from Prof. Thorpe, F.R.S. on "Robert Boyle and the Sceptical Chemist." The Syllabus of the society for the session is as follows:—"Are the Elements Elementary?" by Mr. Pattison Muir; "Graham," by Mr. P. P. Bedson, B.Sc.; "Berzelius," by Mr. J. K. Crow, B.Sc.; "Alkali Manufacture," by Mr. Bevan; "Crystallisation," by Mr. Baker; "Liebig," by Mr. C. F. Cross; "Valensy," by Mr. O'Shea; "Chemical Industry of Japan," by Mr. Sigura; and a paper, subject not settled, by Prof. Gamgee. It is hoped and believed that the society will tend to increase the interest in scientific pursuits already manifested by members of the College.

FRANCE.—A number of important measures have been taken by the French Minister of Public Instruction for fostering the zeal of students and professors in the several French faculties. By a decree issued on November 5 a number of scholarships have been created in each academy at the expense of the public exchequer. In future years scholars are to be appointed after having passed special examinations similar to those for exhibitions in the English universities. Exceptions are created in favour of students who have been particularly successful in taking their preliminary degrees and have published approved papers in the *Academical Transactions*, or have rendered special services in tuition. For the present year the different scholarships are to be granted by a special commission. Three of these commissions have been established—one for letters, another for science, and the third for medicine. These scholarships are to be continued only for a limited time, varying from two to four years, but are to be stopped at once if the scholar does not give satisfaction to the professors or lecturers. A part of these scholarships is to be granted to candidates for the mastership of arts (*Licencié-ès-Lettres et ès-Sciences*), and another part to the masters in several faculties wishing to take the highest honours in their respective faculties. By another decree, published on the same day, M. Brunet has created a number of lectureships styled "conferences." A number of the lecturers are to act as public tutors, helping public professors in their duties. Other lectureships are to be granted to professors teaching supplementary sciences which, up to the present time, have not come within the limits of the official programme. The salary of all of them is 120*l.*, and they are to be appointed yearly from among doctors or members of the academies. In some peculiar cases Masters of Arts are eligible to these lectureships. The new organisation is expected to work during the present classical year.